DOCUMENT RESUME

ED 180 750 SE 029 346

AUTHOR Benjamin, Carl: And Others
TITLE College Arithmetic and Pre-Algebra.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE [75]
GRANT NSF-GZ-2998
NOTE 104p.; For related documents, see SE 029 345-348: Colored pages may not reproduce well

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Arithmetic: *College Mathematics; Criterion Referenced Tests; Decimal Fractions; Diagnostic Tests; *Educational Objectives; Fractions; Geometric Concepts; Higher Education; Measurement; Percentage; *Performance Criteria; Ratios (Mathematics); Set Theory; Whole Numbers
IDENTIFIERS *Pre Algebra

ABSTRACT

Presented are student performance objectives, a student progress chart, and assignment sheets with objective and diagnostic measures for the stated performance objectives in college arithmetic and pre-algebra. Topics covered include: sets, whole numbers, integers, decimal fractions, fractions, ratio and proportion, percent, powers and roots, the Pythagorean theorem, measurement, and open sentences. (MK)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED180750

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Mary L. Charles
NSF
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

COLLEGE ARITHMETIC and PRE-ALGEBRA

PROJECT PARTICIPANTS

Carl Benjamin
Sharon Edgmon
Catherine Johnson
W. F. Johnson
David Keranen
Gary Matulef
Paul Meert
William Nielsen
Jack L. Rowe
Shirley Trembley
William Ward
Billie Williams
Marion Smith, Project Director

TECHNICAL ASSISTANTS

Lauraine Cook
Minta Tillman

SE 029 346

These materials were prepared pursuant to grant number GZ-2998, *Proposal* 4/4205 *National Science Foundation*

INTRODUCTION

During the Summer of 1974 criterion-referenced diagnostic tests were written for college arithmetic and college algebra. The materials included herewith are student performance objectives, student progress chart, assignment sheets/objective and diagnostic measures for each objective.

The materials were prepared for use at specific colleges in the 1974-75 school year and were so named to match the college numbering system.

College Arithmetic is the same as Math 60.

College Arithmetic and Pre-Algebra is the same as Math 50.

College Algebra I is the same as Math A.

College Algebra II is the same as Math D.

OBJECTIVES

MATHEMATICS 50

OBJECTIVES

1. SETS

   1.1 SET NOTATION. The student will translate English statements into set notation and symbolic statements into English statements.

   1.2 SETS. The student will identify sets, subsets, finite sets, infinite sets, equal sets, equivalent sets, universal sets, and the empty (null) set.

   1.3 SETS: OPERATIONS. Given two sets, the student will write their intersection and/or union or determine one-to-one correspondence if one exists.

2. WHOLE NUMBERS

   2.1 THE PROPERTIES AND IDENTITIES OF ARITHMETIC OF WHOLE NUMBERS. The student will identify and apply:

   (a) the commutative, associative, and distributive properties, and

   (b) the additive and multiplicative identity elements

   as related to whole numbers.

3. INTEGERS

   3.1 INTEGERS: ABSOLUTE VALUE AND ORDERING. The student will compare the members of integers and arrange in increasing order.

   3.2 INTEGERS: ADDITION AND SUBTRACTION. Given two or more integers, the student will correctly add or subtract them.

   3.3 INTEGERS: MULTIPLICATION. Given two or more integers, the student will correctly multiply them.

3.4 INTEGERS: DIVISION. The student will correctly divide a five-digit integer by a three-digit integer.

3.5 INTEGERS: ORDER OF OPERATIONS: The student will evaluate any integral expression involving the use of the four fundamental operations.

3.6 INTEGERS: PRIMES AND COMPOSITES: The student will change a composite number into prime factored form using exponential notation.

4. DECIMAL FRACTIONS

4.1 DECIMAL FRACTIONS: ROUNDING. Given a decimal fraction, the student will round it to the designated accuracy.

4.2 DECIMAL FRACTIONS: ADDITION. Given a set of positive and/or negative decimal fractions, the student will correctly determine their sum.

4.3 DECIMAL FRACTIONS: SUBTRACTION. Given a set of positive and/or negative decimal fractions, the student will correctly determine their difference.

4.4 DECIMAL FRACTIONS: MULTIPLICATION. Given a set of positive and/or negative decimal fractions, the student will correctly determine their product and round to the indicated accuracy.

4.5 DECIMAL FRACTIONS: DIVISION. The student will correctly find the quotient of two decimal fractions and round to the indicated accuracy.

4.6 RELATIONSHIP BETWEEN DECIMAL AND COMMON FRACTIONS. The student will change a given common fraction to a decimal fraction or a given decimal fraction to a common fraction in reduced form.

4.7 SCIENTIFIC NOTATION. Given a number in standard notation, the student will change to scientific notation, or given a number in scientific notation, the student will change to standard notation.

5. FRACTIONS

5.1 INTRODUCTION. Given a fraction, the student will:

(a) identify the numerator and denominator, and

(b) classify it as proper or improper.

5.2 REPEATING DECIMALS. The student will correctly change:

(a) fractions to repeating decimals,

(b) repeating decimals to fractions, and

(c) identify as a repeating or terminating decimal.

5.3 FRACTIONS: NUMBER THEORY. Given a set of numbers, the student will determine their least common multiple and greatest common divisor. Given a set of fractions, the student will determine their lowest common denominator.

5.4 FRACTIONS: ORDERING. Given two or more fractions, the student will correctly order them.

5.5 FRACTIONS: MULTIPLICATION. Given a set of fractions, the student will perform indicated multiplications.

5.6 FRACTIONS: DIVISION. Given a set of fractions, the student will perform indicated divisions.

5.7 FRACTIONS: ADDITION. Given a set of fractions, the student will correctly determine their sum.

5.8 FRACTIONS: SUBTRACTION. Given a set of fractions, the student will perform indicated differences.

6. RATIO AND PROPORTION

6.1 RATIO. Given two numbers, the student will write their ratio.

6.2 PROPORTION. Given three terms of a proportion, the student will determine the missing terms.

7. PERCENT

7.1 PERCENT. The student will correctly change a decimal fraction to a percent number and a percent number to a decimal fraction.

8. POWERS AND ROOTS.

8.1 POWERS OF NUMBERS. The student will correctly evaluate a rational number raised to a whole number power.

8.2 POWERS AND ROOTS: TABLES. Given a table of square and square root numbers, the student will determine the square or square root of a number as indicated.

8.3 SQUARE ROOT ALGORITHM. (optional) The student will determine the square root of a number to the nearest thousandth by applying the square root algorithm.

9. PYTHAGOREAN THEOREM

9.1 PYTHAGOREAN THEOREM. Given the lengths of two sides of a right triangle, the student will determine the length of the third side by using the Pythagorean theorem.

10. MEASUREMENT - ENGLISH

10.1 LENGTH. The student will correctly determine the perimeters of given triangles, squares, and rectangles, and the circumference of a given circle.

10.2 WEIGHT. The student will convert from one English unit of weight measure to another and will solve problems involving cost per unit of weight.

10.3 AREA. The student will calculate the areas of given geometric figures.

10.4 VOLUME: The student will calculate the columes of given geometric figures.

11. MEASUREMENT - METRIC AND ENGLISH RELATIONS

11.1 VOCABULARY. The student will identify the basic units of metric measure.

11.2 LENGTH. The student will measure given segments in metric units and will convert English and metric units as indicated.

11.3 AREA. Given the metric measurements of a two-dimensional figure, the student will determine its area. Given the area of a two-dimensional figure, the student will correctly convert from English to metric units or from metric to English units.

11.4 CAPACITY. Given a measure of capacity, the student will convert from metric to English **or** from English to metric measure.

11.5 MASS. Given the mass of an object, the student will convert from metric to English or from English to metric measure.

11.6 TEMPERATURE. The student will correctly convert given temperature from Fahrenheit to Centigrade to Fahrenheit.

12. OPEN SENTENCES

12.1 LINEAR EQUATIONS. The student will determine the solution set of a given linear equation and check by substitution.

STUDENT PROGRESS CHART

MATH 50

STUDENT PROGRESS CHART

STUDENT'S NAME	sets				integers						decimal fractions							fractions															english				metric								
	1.1 Symbols	1.2 Classification	1.3 Operation	2.1 Properties	3.1 Ordering	3.2 Add-Subtract	3.3 Multiply	3.4 Divide	3.5 Order of Operations	3.6 Prime-Composites	4.1 Rounding	4.2 Add	4.3 Subtract	4.4 Multiply	4.5 Divide	4.6 Relationship	4.7 Scientific Notation	5.1 Introduction	5.2 Repeating Decimal	5.3 Number Theory	5.4 Ordering	5.5 Multiply	5.6 Divide	5.7 Add	5.8 Subtract	6.1 Ratio	6.2 Proportion	7.1 Percent	8.1 Powers	8.2 Roots	8.3 Algorithm	9.1 Pythagorean Theorem	10.1 Length	10.2 Weight	10.3 Area	10.4 Volume	11.1 Terminology	11.2 Length	11.3 Area	11.4 Capacity	11.5 Mass	11.6 Temperature	12.1 Linear Equations

ASSIGNMENT SHEET

MATHEMATICS 50
ASSIGNMENT SHEET

TOPICS		TEXTS - MATERIALS			
NUMBER	TITLE	WRIGHT	MOON	TAPE NUMBER	OTHER
	SETS				
1.1	Set Notation	Ex. 1.1, pp. 1-4			
1.2	Sets	Ex. 1.2, pp. 4-9			
1.3	Sets	Ex 1.2, pp. 4-9			
2	WHOLE NUMBERS (Properties & Identities)	Ex. 3.1, pp. 35-39 Ex. 3.3-1, pp. 43-47	Unit 2, pp.10-20 Unit 4, pp.31-46	2 4	
	INTEGERS				
3.1	Absolute Value	Ex. 10.3, pp. 187-191			
3.2	Add and Subtract	Ex. 10.4, pp. 191-194; Ex. 10.5, pp. 195-198			
3.3	Multiplication	No mod			
3.4	Division	No mod			
3.5	Order of Operations	Ex. 3.4, pp. 62 Problems 46-59			
3.6	Primes & Composites	Ex. 4.1, pp. 70-73 Ex. 4.2, pp. 73-75	Unit 9, pp.90-93 Problems pp.94-96	9	

NUMBER	TITLE	WRIGHT	MOON	TAPE NUMBER	OTHER
	DECIMAL FRACTIONS				
4.1	Rounding	Ex. 6.3, pp.124-127	Unit 22, pp.229-233: Problems pp. 234-235	22	
4.2	Addition	Ex. 6.4, pp.127-130	Unit 20, pp.207-210; Problems pp. 214-215	20	
4.3	Subtraction	Ex. 6.4, pp. 127-130	Unit 20, pp.210-213; Problems 214-215	20	
4.4	Multiplication	Ex. 6.5,pp.130-133	Unit 21, pp.220-223; Problems 224-228	21	
4.5	Division	Ex. 6.6, pp.133-138	Unit 23, pp.238-246; Problems 247-251	23	
4.6	Relationship Between Decimals and Fractions	Ex. 6.7, Problems 4-40, pp.141-142	Unit 23, pp.242-247; Problems 11-17, p.248	23	
4.7	Scientific Notation	Group module			
	FRACTIONS				
5.1	Introduction	Ex. 5.2, Problems 2-11, pp.81-85	Unit 11, pp.108-114; Problems pp. 115-118	11	
5.2	Repeating Decimals	Ex. 5.2, Problems 4-25, pp.138-142			

NUMBER	TITLE	WRIGHT	MOON	TAPE NUMBER	OTHER
5.3	Number Theory	Ex. 4.3, pp.75-77	Unit 10, pp. 97-101; Problems 11.98-105; Unit 13, pp.132-134; Problems 5-8, p. 135	10 13	
5.4	Ordering	Ex. 5.6, problems 1-20,pp.96-98	Unit 12, pp.123-124; Problems 7-8, p.125; Problems 23-28, p.126	12	
5.5	Multiplication	Ex. 5.2, Problems 32-50, pp.81-85 Ex. 5.10, pp.107-110	Unit 15, pp.154-160; Problems 1-12, p. 161; Problems 1-40, pp.162-163	15	
5.6	Division	Ex. 5,11,pp.110-113; Problems 1-40	Unit 16, pp.166-171; Problem 1-10, p. 172; Problems 1-28, pp. 173-174	16	
5.7	Addition	Ex. 5.5, pp. 91-96. Ex. 5.8, pp.103-105.	Unit 14, pp.138-144; Problems 1-8, p.148	14	
5.8	Subtraction	Ex. 5.6; problems 21-40, pp.96-98. Ex. 5.9, pp.105-107	Unit 14, pp.144-147; Problems 1-18, p.149;Problems 9-11, p. 148; Problems 19-32, p. 149	14	
	RATIO				
6.1	Ratio	Ex. 7.1, pp.144-145			

NUMBER	TITLE	WRIGHT	MOON	TAPE NUMBER	OTHER
6.2	Proportion	Ex. 7.2, pp.146-148. Ex. 7.2, pp.146-148. Ex. 7.3, pp.148-150. Ex. 7.4, pp.150-154.			
	PERCENT				
7	Percent	Ex. 8.1-8.5, pp.155-170; Problems 1-46, pp.170-171.	Unit 28, pp.292-297; Problems 1-18, p.298; Problems 1-22, pp. 299-300.	28	
	SQUARE ROOTS				
8.1	Powers of Numbers	Ex. 2.3, pp.14-16 Ex. 9.1, pp.172-174; Problems 1-35.	Unit 8, pp.82-84 Problems 1-23, p 87 ; Problems 1-18, p.88	8	
8.2	Tables	Ex. 9.1, Problems 36-65, pp.172-174	Unit 8, pp.85-86 Problems 24-30, P. 87; Problems 19-25, p.88	8	
8.3	Algorithm	Ex. 9.2, pp.174-177.	Unit 25, pp. 263-271; Problems 1-10, p. 272	25	
9	PYTHAGOREAN THEOREM	Ex. 9.4, pp. 178-181			

NUMBER	TITLE	WRIGHT	MOON	TAPE NUMBER	OTHER
	MEASUREMENT: ENGLISH				
10	Perimeter and Circumference	Ex. 12.4; Problems 8-15, pp.236-243	Unit 36,pp.388-398; Problems 1-22,pp.398-399; Problems 1-8, p.400.	36	
10.2	Weight (Mass)	No mod			
10.3	Area	Ex. 12.5, pp.245-252.	Unit 37, pp.403-416; Problems 1-9, p.427; Problems 1-14, pp. 428-429.	37	
10.4	Volume	Ex. 12.6, pp.253-254.	Unit 38, pp.422-426; Problems 1-11, p.427; Problems 1-14, pp. 428-429.	38	
	MEASUREMENT: METRIC				
11.1	Metric Measure	No mod	Unit 34, p.369		
11.2	Measurement of Length	No mod	Unit 34, pp.367-369; Problems 1-15, p.370; Problems 1-20, p. 371.		
11.3	Area	No mod			
11.4	Capacity	No mod			
11.5	Mass	No mod			
11.6	Temperature	No mod			
12	LINEAR EQUATIONS	Ex. 11.2,11.3,pp. 206-214.			

TABLE OF CONTENTS

MATHEMATICS 50

UNIT TESTS

Table of Contents

1. SETS

1.1 Set Notation

1.2 Sets

1.3 Sets: Operations

2. WHOLE NUMBERS

2.1 The Properties and Identities of Arithmetic of Whole Numbers

3. INTEGERS

3.1 Integers: Absolute Value and Ordering

3.2 Integers: Addition and Subtraction

3.3 Integers: Multiplication

3.4 Integers: Division

3.5 Integers: Order of Operations

3.6 Primes and Composites

4. DECIMAL FRACTIONS

4.1 Decimal Fractions: Rounding

4.2 Decimal Fractions: Addition

4.3 Decimal Fractions: Subtraction

Table of Contents

4.4 Decimal Fractions: Multiplication

4.5 Decimal Fractions: Division

4.6 Relationship Between Decimal and Common Fractions

4.7 Scientific Notation

5. FRACTIONS

5.1 Introduction

5.2 Repeating Decimals

5.3 Fractions: Number Theory

5.4 Fractions: Ordering

5.5 Fractions: Multiplication

5.6 Fractions: Division

5.7 Fractions: Addition

5.8 Fractions: Subtraction

6. RATIO AND PROPORTION

6.1 Ratio

6.2 Proportion

7. PERCENT

7.1 PERCENT

Table of Contents

8. POWERS OF NUMBERS

8.1 Powers of Numbers

8.2 Powers and Roots: Tables

8.3 Square Root Algorithm (optional)

9. PYTHAGOREAN THEOREM

9.1 Pythagorean Theorem

10. MEASUREMENT - ENGLISH

10.1 English Measure: Length

10.2 English Measure: Weight (Mass)

10.3 English Measure: Area

10.4 English Measure: Volume

11. MEASUREMENT - METRIC AND ENGLISH RELATIONS

11.1 Metric: Vocabulary (in module)

11.2 Metric: Length

11.3 Metric: Area

11.4 Metric: Capacity

11.5 Metric: Mass

11.6 Metric: Temperature

12. OPEN SENTENCES

12.1 Solving Linear Equations

UNIT TESTS

TOPIC 50-1.1

SET NOTATION

OBJECTIVE:

● To correctly classify and write the symbols for set, empty set, subset, union, intersection, and element of a set.

A. Answer as indicated.

1. Write symbolically.
   a. The set whose elements are a, b, and c.
   b. The union of sets S and T.
   c. A is a subset of B.
   d. The intersection of sets S and T.
   e. The empty or null set.
   f. a is an element of set B.
2. Write the set containing the letters in the word "mathematics".
3. List the elements of the set of all whole numbers greater than 11 but less than 20.
4. Let W = {all whole numbers}.
   List the elements of set $A = \{x \in W \mid 0 < x > 10\}$.
5. Translate into words.
   a. $6 \in A$ b. $B \cap C$ c. $D \subset E$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-1.1

B. Copy and translate into words.

1. $\emptyset \cup A$
2. $B \cap C$
3. $6 \in \{1,2,3,4,5,6\}$
4. $\{0,1\} - \{0,1,2,3,4\}$

C. List the elements of the following sets where $W = \{0,1,2,3,4,...\}$

1. $\{x \in W | x < 10\}$
2. $\{x \in W | 3 \leq x < 15\}$
3. $\{x \in W | x$ is odd number less than 20$\}$
4. $\{x \in W | x$ is even number less than 20$\}$
5. $\{x \in W | 18 < x < 19\}$

TOPIC 50-1.2

SETS

OBJECTIVE:

● To identify empty (null) sets, subsets, finite sets, infinite sets, equal sets, universal sets, and equivalent sets.

A. 1. Copy and identify each of the following as a finite or infinite set.

   a. {0,1,2,3}

   b. {0,1,2,...,40,41}

   c. {6,7,8,...}

2. Copy and identify as equal and/or equivalent sets.

   a. {0,1,2}, {2,1,0}

   b. {20,21,22}, {a,b,c}

3. Answer the following.

   a. How many elements has the null set?

   b. What is a symbol for the null set?

4. Copy and tell which sets are subsets of the universal set U = {0,1,2,...,19,20}.

   1. {0,5}

   2. {5,10,15,...}

   3. ∅

   4. {16}

   5. {10, 20, 30}

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-1.3

SETS

OBJECTIVES:

- To find the union and intersection of two or more sets.
- To find the subsets of a given set.
- To determine if a one to one correspondence exists between two sets and illustrate that correspondence.

A. Copy and answer as indicated.

1. a. $\{0,1,2\} \cap \{a,b,c\}$
   b. $\{4,5,6,8\} \cap \{0\}$
   c. $\{0,2,4,6,8\} \cap \{0\}$
   d. $A \cap \emptyset$
2. a. $\{0,1,2\} \cup \{a,b,c\}$
   b. $\{4,5,6,7\} \cup \{1,2,3,4\}$
   c. $\{0,2,4,6,8\} \cup \{0\}$
   d. $A \cup \emptyset$
3. For each of the following pairs, illustrate a 1:1 correspondence, if it exists.
   a. $\{0,1,2\}$ and $\{a,b,c\}$
   b. $\{2,4,6,8\}$ and $\{1,3,5\}$
4. List all the subsets of $\{0,1,2\}$.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-1.3

B. Indicate the following statements as true or false.

1. The intersection of a set and the null set is always the null set.
2. The union of two sets is itself a set.
3. $\emptyset = \{0\}$
4. Two sets have to be equal in order to show a 1-1 correspondence between them.
5. The intersection of two sets is a subset of the two sets.
6. The union of two sets is a subset of the two sets.

TOPIC 50-2

WHOLE NUMBERS: PROPERTIES AND IDENTITY ELEMENTS OF ARITHMETIC

OBJECTIVES:

- To identify and apply the commutative, associative, and distributive properties.
- To identify and apply the additive and multiplicative identities of elements.

A. 1. Copy and supply the correct numbers to make the statement true.

$$(2 + 3) + 5 = 2 + (3 + 5)$$

$$(?) + 5 = 2 + (?)$$

$$(?) = (?)$$

This illustrates the ____?____ property of addition.

CONTINUED

CONTINUED

2. Indicate the following statements as true or false.

   a. $4 + 7 = 7 + 4$ b. $4 - 7 = 7 - 4$

   c. $4 \cdot 7 = 7 \cdot 4$ d. $4 \div 7 = 7 \div 4$

   Items a and c are examples of the ___?___ property.

3. Copy and supply the correct numbers to make the statements true.

$$19 \cdot 7 + 19 \cdot 3 = 19 \cdot (?) + (?)$$

$$(?) + (?) = 19 \cdot (?)$$

$$(?) = (?)$$

   This illustrates the ___?___ property.

4. Copy and supply the correct number to make the statement true.

   Given any number N, $n +$ ___?___ $= N$

   This is a statement of the ___?___ identity.

5. Copy and write a true statement by placing a 1 or a 7 in the indicated boxes.

$$\boxed{?} \times \boxed{?} = \boxed{?}$$

   This is an example of the ___?___ identity.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.1

INTEGERS: ABSOLUTE VALUE AND ORDERING

OBJECTIVE:

● To order integers and use correctly the symbols for less than, greater than, equal to, and absolute value.

A. 1. Copy and place a <, >, or = in the blank.

a. $7 __?__ 5$

b. $1 \times 1 \times 1 __?__ 1$

c. $-7 __?__ |-7|$

d. $5^2 + 2^1 __?__ 4^2 + 2^2$

2. Copy and arrange in increasing order.

a. $\{101, -5, |-5|, 0\}$

b. $\{10, 1, -10\}$

c. $\{-4, +|-7|, -(+7), +4\}$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.1

B. Copy and write the answer that makes the sentence true.

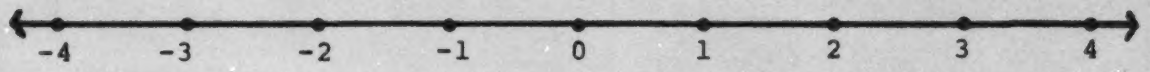
1. ___?___ < -3

   a. +6 b. -6 c. -3

2. ___?___ < |-2|

   a. +2 b. -2 c. -3

C. Copy this number line and locate the following integers on it.



1. +2 2. -3 3. 0

4. -|+3| 5. -|-2|

D. 1. 2 > 3 means 2 ___?___ 3.

2. 5 < 8 means 5 ___?___ 8.

3. Write the symbol for "less than or equal to".

4. Write the symbol for "greater than or equal to".

TOPIC 50-3.2

INTEGERS: ADDITION AND SUBTRACTION

OBJECTIVE:

● To perform the operations of addition and subtraction of integers.

A. Copy and perform indicated operations in problems 1 - 4.

1. $\begin{array}{r} -385 \\ +\ -435 \\ \hline \end{array}$

2. $\begin{array}{r} -922 \\ -\ +587 \\ \hline \end{array}$

3. $\begin{array}{r} 0 \\ -\ -34 \\ \hline \end{array}$

4. $-97 + 65 - 81 + 102 = \underline{\quad ? \quad}$

5. Subtract +137 from -2.

6. $(+74) + (\underline{\quad ? \quad}) = -92$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.2

B. Copy and add.

1. (+0) + (+8) = ___?___
2. (+9) + (-8) = ___?___
3. (-9) + (+8) = ___?___
4. (-9) + (8) = ___?___

C. Copy and subtract.

1. (+9) - (+8) = ___?___
2. (+9) - (-8) = ___?___
3. (-9) - (+8) = ___?___
4. (-9) - (-8) = ___?___

D. Copy and fill in the blank.

1. (+6) + (?) + 0
2. (+6) - (?) = 0

E. The problem "subtract 6 from 3" should be written: (choose the correct answer)

1. 6 - 3
2. 3 - 6

F. Copy and choose ALL the expressions that are the equivalent to the expression "8 - 2".

1. (+8) - (+2)
2. (+8) - (-2)
3. (+8) + (-2)
4. (-2) + (+8)
5. -2 + 8
6. 2 - 8

TOPIC 50-3.3

INTEGERS: MULTIPLICATION

OBJECTIVE:

- To perform the operation of multiplication of integers.

A. Copy and multiply.

1. $(-456) \times (+39) =$?
2. $(-9009) \times (-909) =$?
3. The product of -6, -5, and -2 is ?.
4. $(-7)^2 =$?

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.3

B. $-12 =$ ___?___ Copy and select ALL correct responses.

1. $(-3)(-4)$
2. $(-2)(-2)(-3)$
3. $(-3)(+4)$
4. $(-2)(+2)(-3)$
5. $(+3)(-4)$
6. $(-2)(+2)(+3)$
7. $(-2)(+2)(+3)$
8. $(+2)(+2)(-3)$

C. "2 times 3" can be written as ___?___. Copy and select ALL correct responses.

1. 2×3
2. $(2)(3)$
3. $2 \cdot 3$
4. $2 + 3$
5. $2\,(3)$
6. 2^3

D. $2 \times 3 \times 4 =$ ___?___ Copy and select the correct response.

1. 14
2. 48
3. 24
4. 10
5. 9

E. $5^2 =$ ___?___ Copy and select the correct response.

1. 7
2. 10
3. 25
4. 32

F. Multiply: 1008×707

TOPIC 50-3.4

INTEGERS: DIVISION

OBJECTIVE:

- To perform the operation of division of integers.

A. Copy and perform the operation.

1. $369\overline{)17343}$
2. $14\overline{)830}$
3. $(+45135) \div (+15)$
4. $(+120) \div (-12)$
5. $\frac{-152}{-19}$
6. $(0) \div (-17)$
7. $+ 23 \times (?) = -2047$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.4

B. Place a + sign or a - sign in front of the quotient to make the statement true.

1. $(+6) \div (+2) = (\ ?\ 3)$
2. $(+6) \div (-2) = (\ ?\ 3)$
3. $(-6) \div (+2) = (\ ?\ 3)$
4. $(-6) \div (-2) = (\ ?\ 3)$

C. Make 2 and 3 equivalent to 1 by placing the numbers 2, 4, and 8 in the proper boxes.

1. $2\overline{)8}$ $\quad 4$
2. $\square \div \square = \square$
3. $\dfrac{\square}{\square} = \dfrac{\square}{\square}$

D. These problems are not completed correctly. Copy and divide correctly. Simplify the quotient if necessary.

1.
$$\begin{array}{r} 22 \\ 8\overline{)1616} \\ \underline{16} \\ 16 \\ \underline{16} \end{array}$$

2.
$$\begin{array}{r} 2\ \frac{2}{6} \\ 6\overline{)14} \\ \underline{12} \\ 2 \end{array}$$

3.
$$\begin{array}{r} 4 \\ 12\overline{)480} \\ \underline{48} \end{array}$$

TOPIC 50-3.5

INTEGERS: ORDER OF OPERATIONS

OBJECTIVE:

● To perform the four fundamental operations in the correct order.

A. Copy and evaluate each expression.

1. $7 + 3 \cdot 2 - 1 + 9 \div 3$
2. $14 \div 2 + 2 \cdot 8 + 30 \div 5 \cdot 2$
3. $(75 - 3 \cdot 5) \div 10 - 4$
4. $6 - (-4)(-3) - (-30)/5$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.5

B. Copy and place parenthesis, ( ), or brackets, [] , around the operation that is to be performed <u>first</u>.

Example: $3 + (2 \cdot 2)$

1. $14 - 2 \cdot 6$
2. $21 \div 7 \div 3$
3. $9 + 2 + 6 \div 3$
4. $5 \cdot (2 + 3)$
5. $8 \div 2 + 8$

C. Copy the letters a, b, and c and indicate which steps should be performed 1st, 2nd, or 3rd.

__?__ a. Going from left to right, perform any additions or subtractions in the order they appear.

__?__ b. Perform the operations within parentheses.

__?__ c. Going from left to right, perform any multiplication or division in order.

TOPIC 50-3.6

INTEGERS: PRIMES AND COMPOSITES

OBJECTIVE:

● To write the prime factorizarion of whole numbers using exponential notation.

Example: $6 = 3 \cdot 2$

A. Copy and write the prime factorization of the following.

1. 10	2. 34	3. 51
4. 26	5. 83	6. 206

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-3.6

B. Copy and write the prime factorization of the following.

1. 8	2. 1000	3. 1296
4. 225	5. 531	6. 434

C. Copy and find prime factorization of the following.

1. 81	2. 98	3. 361
4. 100	5. 105	6. 377

TOPIC 50-4.1

DECIMAL FRACTIONS: ROUNDING

OBJECTIVE:

- To round a number to the designated decimal place.

  Example: Round 2.5175 to the nearest thousandth.

  Solution: 2.5175 = 2.518

  Example: Round 4.51674 to the nearest ten thousandth.

  Solution: 4.51674 = 4.5167

A. Do the following.

1. Round 1.5619 to the nearest tenth.
2. Round 0.419 to the nearest hundredth..
3. Round 2.54564 to the nearest ten-thousandth.
4. Round 1.0609 to the nearest thousandth.

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-4.1

B. Copy and round to the nearest tenth.

1. 1.64
2. 2.9687
3. 1.06
4. 3.009

C. Copy and round to the nearest hundredth.

1. 1.64
2. 16.4646
3. 1.074
4. 3.009

D. Copy and round to the nearest thousandth.

1. 1.64
2. 16.4646
3. 1.0744
4. 3.0009

E. Copy and round off to the nearest ten-thousandth.

1. 1.64
2. 16.464646
3. 1.07544
4. 3.00009

TOPIC 50-4.2

DECIMAL FRACTIONS: ADDITION

OBJECTIVE:

- To add decimals.

  Example: 1.32 + (+10.1) + (-3.4602) = 7.9598

A. Copy and add.

1. 3.002 + (+.110) + (-1.34)
2. (+7.56) + (-1.96) + (+.21)
3. -.002 + 4.606 + (3.1) + (-3.1)
4. (+.002) + (-4.606) + (-3)

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-4.2

B. Copy and add.

1. 3.001 + 24.01 + 356.1 + .0001

2. 3.001 + (+24.01) + (-356.1) + (-.0001)

3. (-3.001) + (-23) + (-356.1) + (-.0001)

4. (+3.0001) + (-24.01) + (+356.1) + (.0001)

TOPIC 50-4.3

DECIMAL FRACTIONS: SUBTRACTION

OBJECTIVE:

- To subtract decimals.

  Example: 3.025 - (-1.6) = 4.625

A. Copy and subtract.

1. 3 - .0679
2. (-3.4) - (-7.46)
3. (+3.46) - (+7.463)
4. .0002 - (-.002)

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-4.3

B. Copy and subtract.

1. 8.032 - 3.06
2. 13.87 - 2.6
3. (+8.032) - (-3.06)
4. (-13.87) - (2.6)
5. (-13.87) - (-2.6)
6. -.032 - 3

TOPIC 50-4.4

DECIMAL FRACTIONS: MULTIPLICATION

OBJECTIVES:

- To multiply decimals.
- To round off the product to the designated decimal place.

A. Copy and answer as indicated.

1. $6.04 \times (-1.01)$
2. $(-.323) \times (-5)$
3. $.006 \times (-6.3) \times (-6)$
4. $3.849 \times .056$ (Round product off the the nearest thousandth.)
5. $3.849 \times .056$ (Round the product to the nearest thousandth.)

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and multiply.

1. $.01 \times .001 \times .1$
2. $(-1) \times (-.1) \times (.01) \times (-.001)$
3. $(-346.2) \times (+.341)$
4. $(-3.008) \times (-4.9)$

C. Copy and answer as indicated.

1. $.017 \times (-3.06)$ (Round product to the nearest tenth.)
2. $-450 \times -.45$ (Round product to the nearest integer.)
3. $84.91 \times .0909$ (Round off product to the nearest hundredth.)

TOPIC 50-4.5

DECIMAL FRACTIONS: DIVISION

OBJECTIVES:

- To divide decimals.
- To round the quotient to the indicated place.

A. Copy and answer as indicated.

1. $.037\overline{).00444}$?

2. $2.6\overline{)159.38}$?

3. $0.0041\overline{)0.1892}$? (Round off quotient to the nearest thousandth.)

4. $406\overline{).03007}$? (Round off the quotient to the nearest ten-thousandth.)

5. $.406\overline{)3007}$? (Round off the quotient to the nearest integer.)

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and round to the indicated decimal place.

1. 3.847 to the nearest hundredth
2. 200.7980 to the nearest tenth
3. 0.492718 to the nearest ten-thousandth
4. 0.04850 to the nearest thousandth

C. Copy and divide.

1. $.14\overline{).028}$
2. $3.07\overline{)24.56}$
3. $.0023\overline{)9.2}$
4. $9\overline{)0.00027}$
5. $.006\overline{)12}$

TOPIC 50-4.6

RELATIONSHIP BETWEEN DECIMAL AND COMMON FRACTIONS

OBJECTIVES:

- To change common fractions to decimals.

  Example: $\frac{3}{8} = .375$

  Example: $\frac{1}{9} = .11\frac{1}{9}$

- To change decimals to common fractions in simplest form.

  Example: $.56 = \frac{23}{50}$

A. Copy and express in indicated form. Reduce fractions to the lowest form.

1. $\frac{12}{25}$ = ___?___ as a decimal.

2. $\frac{8}{11}$ = ___?___ as a decimal.

3. .035 = ___?___ as a common fraction.

4. $73\frac{1}{3}$ = ___?___ as a common fraction.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-4.6

B. Copy and write as equivalent decimals.

1. $\frac{3}{4}$

2. $\frac{3}{5}$

3. $\frac{2}{25}$

4. $\frac{7}{10}$

C. Copy and write as indicated.

1. $\frac{5}{12}$ = ____?____ as a decimal.

2. .7 $\frac{1}{2}$ = ____?____ as a fraction.

3. $\frac{8}{9}$ = ____?____ as a decimal.

4. .0005 = ____?____ as a fraction.

D. Copy and write as fractions, reduce to lowest terms.

1. .60

2. .05

3. .25

4. .15

TOPIC 50-4.7

SCIENTIFIC NOTATION

OBJECTIVES:

- To rewrite a given number in scientific notation.

  Example: $0.056 = 5.6 \times 10^{-2}$

- To rewrite a given number in standard notation.

  Example: $5.60 \times 10^{2} = 560$

A. Copy and write in scientific notation.

1. 1.2
2. $(200) \cdot 10^{3}$
3. 193,000,000
4. 0.00000617

Copy and write in standard notation.

5. 2.7×10^{8}
6. 3.25×10^{-3}

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-4.7

B. Copy and write in scientific notation.

1. 1.2
2. 0.00045
3. 0.0021
4. 0.0000054

C. Copy and write in scientific notation.

1. 0.021
2. 10.2
3. 26
4. 705,000

D. Copy and write in standard notation.

1. 1.0×10^{5}
2. 6.538×10^{2}
3. 4.89×10
4. 9.1×10^{7}

E. Copy and write in standard notation.

1. 8.564×10^{-5}
2. 4.69×10^{-1}
3. 7.38×10^{-4}
4. 9.2064×10^{-8}

TOPIC 50-5.1

FRACTIONS: INTRODUCTION

OBJECTIVE:

- To recognize and use correctly the vocabulary of fractions.

A. Copy and fill in the blank with a word or phrase from this list: numerator, proper fraction, improper fraction, mixed number, and denominator.

1. Given the fraction $\frac{18}{7} = 2\frac{4}{7}$.
   a. 18 is a(n) ___?___.
   b. $2\frac{4}{7}$ is a(n) ___?___.
   c. 7 is a(n) ___?___.
   d. $\frac{18}{7}$ is a(n) ___?___.

2. Given the fraction $\frac{c}{d}$.
   a. d is the ___?___.
   b. If $c < d$, $\frac{c}{d}$ is a(n) ___?___.
   c. c is the ___?___.
   d. If $d \geq c$, $\frac{c}{d}$ is a(n) ___?___.

3. Copy and solve.
   a. $\frac{15}{5}$ means ___?___ ÷ ___?___.
   b. $\frac{\ell}{m}$ means ___?___ ÷ ___?___.
   c. $3\frac{7}{8} = \frac{31}{8}$ because $3 = \frac{?}{8}$, and $\frac{?}{8} + \frac{7}{8} = \frac{31}{8}$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.2

REPEATING DECIMALS

OBJECTIVES:

- To recognize repeating and terminating decimals.
- To change fractions to repeating decimals.
- To change repeating decimals to fractions.

A. Copy and work the following problems.

1. Classify each as a terminating or repeating decimal.

   a. .25 b. $.\overline{3}$

   c. 6.252525 d. $831.\overline{831}$

2. Change $\frac{8}{11}$ to a decimal.

3. Change $.\overline{7}$ to a common fraction.

4. How much greater is $\frac{1}{3}$ than .3333?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.2

B. Copy and change each of the following to a decimal and classify each as a terminating or repeating decimal.

1. $\frac{3}{8}$
2. $\frac{8}{10}$
3. $\frac{11}{18}$
4. $\frac{16}{17}$
5. $\frac{1}{9}$

C. Copy and express each as a common fraction reduced to lowest terms.

1. $.\overline{4}$
2. $.\overline{148}$
3. $.7\overline{3}$
4. $.52\overline{7}$
5. $.\overline{42857}$

TOPIC 50-5.3

NUMBER THEORY

OBJECTIVES:

- To find the lowest common multiple (L.C.M.) and the greatest common divisor (G.C.D.) of a given set of numbers.
- To find the lowest common denominator of a set of fractions.

A. Copy and solve.

1. Find the lowest common multiple (L.C.M.) of these numbers: 180, 120, 200.
2. Find the lowest common denominator (L.C.D.) of these fractions: $\frac{13}{84}, \frac{1}{120}, \frac{11}{210}$.
3. Find the greatest common divisor (G.C.D.) of these numbers: 198, 144, 270.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.3

B. Copy and factor into prime factors.

1. 240 2. 432 3. 630

C. Copy and fill in the blanks.

1. If $210 = 2 \cdot 3 \cdot 5 \cdot 7$,

   and $252 = 2^2 \cdot 3^2 \cdot 7$,

   and $315 = 3^2 \cdot 5 \cdot 7$,

   then the L.C.M. = ___?___, and the G.C.D. = ___?___.

2. The L.C.M. of a set of numbers is the smallest number which they will each ___?___

3. The G.C.D. of a set of numbers is the largest number that will ___?___ each of them.

4. The lowest common denominator for $\frac{1}{7}$, $\frac{2}{11}$, $\frac{3}{5}$ is ___?___.

TOPIC 50-5.4

FRACTIONS: ORDERING

OBJECTIVE:

- To order fractions.

Examples: 1. $\frac{19}{36}$ is greater than $\frac{7}{18}$ $(\frac{19}{36} > \frac{7}{18})$

2. $\frac{13}{35}$ is less than $\frac{7}{17}$ $(\frac{13}{35} < \frac{7}{17})$

3. $-\frac{1}{3}$ is less than $-\frac{1}{4}$ $(-\frac{1}{3} < -\frac{1}{4})$

A. Copy and work the following.

1. Write these fractions in increasing order.

$\frac{5}{34}$ $\frac{11}{16}$ $\frac{8}{51}$

2. Which is the largest number?

$\frac{15}{28}$ $\frac{18}{35}$ $\frac{37}{70}$

3. If one pipe's diameter is $\frac{35}{64}$ inches and another pipe's diameter is $\frac{5}{8}$ inches, which one has the greater diameter?

4. Write the symbols >, <, = in the blank so that you will make the statement true.

a. $\frac{9}{17}$ ___ $\frac{23}{40}$ b. $\frac{14}{29}$ ___ $\frac{6}{13}$

c. $\frac{5}{42}$ ___ $\frac{4}{30}$ d. If a > b, then $\frac{1}{a}$ ___ $\frac{1}{b}$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.4

B. Copy and find the common denominator.

1. $\frac{3}{8}, \frac{29}{68}$

2. $\frac{8}{27}, \frac{31}{114}$

3. $\frac{4}{15}, \frac{8}{11}, \frac{2}{3}$

4. $\frac{3}{z}, \frac{2}{n}$

C. Change these fractions to equivalent fractions having the given denominator.

1. $\frac{4}{19} - \frac{?}{57}$

2. $\frac{1}{3} - \frac{?}{57}$

3. $\frac{3}{8} - \frac{?}{56}$

4. $\frac{13}{28} - \frac{?}{56}$

5. $\frac{c}{d} - \frac{?}{ds}$

6. $\frac{r}{s} - \frac{?}{ds}$

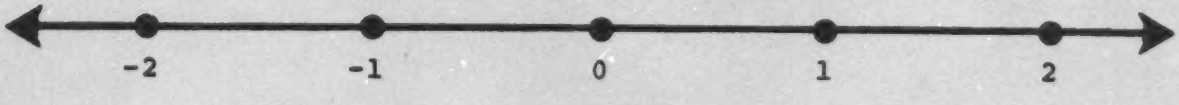
D. Copy and indicate which of the two given fractions is the smaller.

1. $\frac{9}{15}$ or $\frac{10}{31}$

2. $-\frac{18}{35}$ or $-\frac{9}{14}$

3. $\frac{a}{b} < 0$ or $\frac{c}{d} > 0$

E. Copy this number line and locate the following numbers on it.



1. $\frac{1}{3}$

2. $-\frac{1}{4}$

3. $-\frac{3}{2}$

4. $1\frac{1}{4}$

TOPIC 50-5.5

FRACTIONS: MULTIPLICATION

OBJECTIVE:

- To multiply fractions.

A. Copy and multiply (reduce answers to lowest terms).

1. $12\frac{3}{8} \times 35\frac{2}{11}$

2. $\frac{r}{s} \times \frac{t}{u}$

3. $145 \times \frac{3}{5} \times 1\frac{2}{3}$

4. $180 \times 15\frac{4}{9}$

5. To change Fahrenheit temperature readings to Centigrade readings, first subtract 32 degrees from the Fahrenheit reading, then take $\frac{5}{9}$ of the answer. Change the following Fahrenheit readings to Centigrade.

   a. $104^{\circ}F.$ b. $32^{\circ}F.$ c. $212^{\circ}F.$

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.5

B. Copy and change the following to improper fractions.

1. $18\frac{2}{7}$
2. $15\frac{7}{8}$
3. $15 + \frac{7}{8}$
4. $a + \frac{3}{4}$

C. Copy and find the missing number.

1. $\frac{1}{1}\cancel{\frac{29}{8}} \times \cancel{\frac{8}{5}}^{2} \times \cancel{\frac{7}{58}}_{?}$
2. $\cancel{\frac{8}{17}}_{?} \times \cancel{\frac{34}{35}}^{2}$
3. $\cancel{\frac{36}{7}}^{5} \times \cancel{\frac{5}{8}}_{?}$
4. $\cancel{\frac{64}{8}}_{?}^{?} \times \cancel{\frac{8}{3}}_{1}^{1}$

D. Copy and indicate as true or false.

1. $7 \times \frac{3}{4} - \frac{21}{28}$
2. $\frac{1}{15} \times \frac{1}{9} - \frac{2}{135}$
3. $\frac{3}{11} \times \frac{1}{8} - \frac{3}{88}$
4. $\frac{w}{y} \times \frac{z}{a} - \frac{wz}{ay}$
5. $\frac{1}{4} \times -\frac{1}{2} - \frac{1}{4}$
6. $-\frac{1}{3} \times -\frac{2}{5} - \frac{2}{15}$

E. Solve.

1. Find the cost of $2\frac{1}{2}$ dozen eggs at 68¢ per dozen.
2. The radius of a circle is $\frac{1}{2}$ the diameter. Find the radius if the diameter is $2\frac{11}{16}$ inches.
3. Five pieces of rope each $2\frac{3}{4}$ feet long are needed. How many total feet of rope are required?

TOPIC 50-5.6

FRACTIONS: DIVISION

OBJECTIVE:

- To divide fractions.

A. Copy and divide (reduce answers to lowest terms).

1. $11\frac{1}{3} \div 2\frac{5}{6}$

2. Divide $9\frac{1}{3}$ by -3.

3. Simplify: $\dfrac{\frac{3}{8}}{\frac{1}{16}}$

4. $\dfrac{a}{b} \div \dfrac{c}{d}$

5. $(-1\frac{1}{8} \div 2\frac{1}{4}) \div 4\frac{2}{3}$

6. If the distance between Chicage and Cleveland, 360 miles is represented on a road map by a length of $4\frac{1}{2}$ inches, what is the distance between Big Bend and Osage if represented on the same map by a length of $9\frac{3}{8}$ inches?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.6

B. Copy and change the following mixed numbers to a single fraction.

1. $102\ \frac{4}{5}$
2. $79\ \frac{2}{3}$
3. $79 + \frac{2}{3}$
4. $c + \frac{3}{7}$

C. Copy and indicate as true or false.

1. $\frac{29}{30} \div \frac{31}{37} = \frac{29}{30} \times \frac{37}{31}$
2. $\frac{\frac{3}{4}}{\frac{7}{15}} = \frac{3}{4} \div \frac{7}{15} = \frac{3}{4} \times \frac{15}{7}$
3. $-\frac{a}{r} \div \frac{\ell}{m} = -\frac{a}{r} \times \frac{\ell}{m}$
4. $\frac{p}{q} \div \frac{x}{y} = \frac{p}{q} \times \frac{y}{x}$

D. Solve.

1. If $3\ \frac{4}{5}$ lb. of oranges cost 76¢, what is the price per pound?
2. How many pieces of material $3\ \frac{2}{3}$ yd. long can be cut from a bolt $20\ \frac{1}{6}$ yd. long?

TOPIC 50-5.7

FRACTIONS: ADDITION

OBJECTIVE:

- To add fractions.

A. Copy and add (reduce answers to lowest terms).

1. $20\ \frac{3}{4}$
   $8\ \frac{2}{3}$
   $9\ \frac{5}{6}$

2. $3\ \frac{4}{27} + (8\ \frac{1}{39}) + 12\ \frac{2}{3}$

3. $\frac{a}{b} + \frac{c}{b}$

4. $\frac{x}{y} + \frac{m}{2y}$

5. What is the outside diameter of tubing when the inside diameter is $3\ \frac{5}{8}$ inches and the wall thickness is $\frac{5}{16}$ inches?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.7

B. Find the lowest common denominator (L.C.D.) of the given fractions.

1. $\frac{8}{17}, \frac{2}{3}, \frac{7}{51}$

2. $\frac{2}{15}, \frac{8}{60}, \frac{7}{8}$

3. $\frac{1}{3}, \frac{2}{7}, \frac{5}{17}$

4. $\frac{a}{3r}, \frac{b}{r}$

C. Copy and change to equivalent fractions with the indicated denominator.

1. $-\frac{4}{27} = \frac{?}{81}$

2. $\frac{13}{4} = \frac{?}{28}$

3. $\frac{18}{25} = \frac{?}{500}$

4. $\frac{8}{z} = \frac{?}{5z}$

D. Copy and reduce to lowest terms.

1. $\frac{14}{84}$

2. $\frac{85}{17}$

3. $-\frac{105}{120}$

4. $\frac{xy}{xz}$

E. Copy and indicate as true or false.

1. $\frac{3}{7} + \frac{2}{5} = \frac{5}{12}$

2. $\frac{12}{5} + \frac{11}{5} = \frac{23}{5}$

3. $\frac{a}{b} + \frac{c}{b} = \frac{a+c}{b}$

4. $\frac{m}{n} + \frac{h}{d} = \frac{m+h}{n+d}$

TOPIC 50-5.8

FRACTIONS: SUBTRACTION

OBJECTIVE:

- To subtract fractions.

A. Copy and subtract (reduce answers to lowest terms).

1. $18\frac{17}{64}$
$9\frac{5}{24}$

2. $20\frac{2}{9}$
$11\frac{11}{12}$

3. Subtract $8\frac{6}{7}$ from 39.

4. $1\frac{1}{2} - (-\frac{3}{4})$

5. $\frac{k}{m} - \frac{j}{2m}$

6. A stereo record has $5\frac{1}{2}$ minutes playing time on it. It has played for $2\frac{3}{4}$ minutes. How much playing time is left?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-5.8

B. Copy and change to an equivalent fraction with the indicated denominator.

1. $\frac{8}{19} = \frac{?}{76}$

2. $\frac{17}{5} = \frac{?}{30}$

3. $\frac{11}{a} = \frac{?}{2a}$

4. $\frac{15}{m} = \frac{?}{ms}$

C. Copy and find the lowest common denominator (L.C.D.) of the given fractions.

1. $\frac{1}{51}, \frac{2}{3}, \frac{3}{34}$

2. $\frac{1}{8}, \frac{2}{15}, \frac{7}{24}$

3. $\frac{7}{m}, \frac{8}{m}$

4. $\frac{13}{p}, \frac{6}{r}$

D. Copy and find the missing number.

1. $30\frac{2}{7} = 29\frac{?}{7}$

2. $29\frac{1}{5} = 28\frac{?}{15}$

3. $11\frac{3}{5} = 10\frac{?}{30}$

4. $8 = 7\frac{?}{13}$

E. Copy and indicate as true or false.

1. $\frac{7}{17} = \frac{5}{12} = \frac{2}{5}$

2. $-\frac{8}{19} = \frac{2}{19} = \frac{6}{19}$

3. $\frac{m}{n} = \frac{x}{y} = \frac{m - x}{n - y}$

4. $\frac{a}{b} = \frac{c}{b} = \frac{a - c}{b}$

TOPIC 50-6.1

RATIO

OBJCETIVE:

● To write a ratio in reduced form, when given appropriate information.

Example: 6 is to 4 = $\frac{3}{2}$

A. Copy and write as a ratio.

1. 6 inches to 1 foot
2. 7.5 to 22.5
3. 273 to 351
4. $15\frac{1}{2}$ hours to $77\frac{1}{2}$ hours
5. 36 gallons to 240 miles
6. Write a ratio of 10 card tables to 40 chairs.

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-6.1

B. Copy and write as a ratio.

1. 3 to 9
2. $4\frac{1}{2}$ to $13\frac{1}{2}$
3. 2.6 to 15.6
4. 8 to 32
5. 155 to 117

C. Copy and write as a ratio.

1. 2 inches to 1 foot
2. $4\frac{1}{2}$ gallons to 59 miles
3. Write a ratio of 65 houses to 195 radios.
4. 56 radios to 16 families
5. 50 cents to $3

TOPIC

TOPIC 50-6.2

PROPORTION

OBJECTIVE:

- To state and solve proportions.

A. Copy and determine the value of n to make the statement true.

1. $\frac{1.5}{3.5} = \frac{6}{n}$

2. $\frac{11.5}{n} = \frac{6.3}{7.8}$ (Round to the nearest hundredth.)

3. Three cans of beans sell for 41¢. How much will it cost for 15 cans of beans?

4. Gasoline costs 59.5¢ per gallon, if the car goes 80 miles on 5 gallons how much will gas cost for a trip of 200 miles?

5. $\frac{\frac{3}{4}}{6} = \frac{n}{24}$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-6.2

B. Copy and determine the value of n to make the statement true.

1. $\frac{2}{4} = \frac{7}{n}$

2. $\frac{7.5}{30} = \frac{\frac{6}{5}}{n}$

3. $\frac{2.4}{n} \quad \frac{5}{7.5}$

4. $\frac{n}{\frac{6}{7}} = \frac{2\frac{1}{2}}{1\frac{1}{4}}$

C. 1. Two cans of soup sell for 64¢, how much will three cans cost?

2. $1\frac{1}{2}$ gallons of milk cost 28¢, how many candy bars can be purchased for 42¢?

3. Three candy bars cost 28¢, how many candy bars can be purchased for 42¢?

4. There are 25 men in a class of 54 students, what is the ratio of men to women?

TOPIC 50-7

PERCENT

OBJECTIVES:

- To convert decimals, fractions, and percents to equivalent expressions as indicated.
- To solve problems involving percents.

A. Copy and work the following:

1. Change .382 to percent.
2. What is 28% of 400?
3. What percent of 40 is 8?
4. Change 39½% to a decimal.
5. 26 is 65% of what number?
6. Change ¼% to a decimal.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-7

B. Copy and work the following.

1. Change 100 to percent.
2. Change 3.82 to percent.
3. Change 1.25% to a decimal.
4. Change 150% to a decimal.

C. Copy and work the following.

1. What is 100% of 10?
2. What is 8% of 35?
3. What is ½% of 50?
4. What is 60% of .625?

D. Copy and solve.

1. What percent of 32 is 4?
2. What percent of 100 is 200?
3. 35 is what percent of 100?
4. 300 is what percent of 3?

E. Copy and solve.

1. 75 is 30% of what number?
2. 19.5 is 30% of what number?
3. 44 is 110% of what number?
4. .45 is ½% of what number?

TOPIC 50-8.1

POWERS OF NUMBERS

OBJECTIVE:

- To evaluate powers of numbers.

A. Copy and evaluate.

1. $(-.03)^2$
2. 2^4
3. $(-.01)^5$
4. $(\frac{3}{4})^3$
5. $(2\frac{1}{8})^2$
6. $10^2 \times 10^4$
7. -2^4
8. Square of 46 = ___?___
9. Square of $\frac{4}{5}$ = ___?___

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-8.1

B. Copy and evaluate.

1. 78^2

2. $.75^2$

3. $(\frac{7}{8})^2$

4. $(.002)^3$

5. $(2\ \frac{2}{5})^2$

C. Copy and evaluate.

1. $10^1 \times 10^2 \times 10^0$

2. $(\frac{2}{3})^2 \times (\frac{1}{2})^3$

3. -1^{17}

4. -2^6

5. $\frac{3^3}{4^2}$

TOPIC 50-8.2

POWERS AND ROOTS: TABLES

OBJECTIVES:

- To use tables for determining square roots.
- To use tables for squaring certain numbers.

TABLE 50-8.2.1

TABLE OF SQUARES AND SQUARE ROOTS

Number	Square	Square Root	Number	Square	Square Root
1	1	1.000	11	121	3.317
2	4	1.414	12	144	3.464
3	9	1.732	13	169	3.606
4	16	2.000	14	196	3.742
5	25	2.236	15	225	3.873
6	36	2.449	16	256	4.000
7	49	2.646	17	289	4.123
8	64	2.848	18	324	4.243
9	81	3.000	19	361	4.359
10	100	3.162	20	400	4.472

TOPIC 50-8.2

A. Use Table 50-8.2.1 to answer the following.

1. Find the square of 17.
2. Find the square root of 361.
3. Find $(2.449)^2$ to the nearest whole number.
4. Find $\sqrt{12}$ to the nearest tenth.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

B. Copy and find the square of each (use Table 50-8.2.1).

1. 5
2. 14
3. 18
4. 11

C. Copy and find the square root of each (use Table 50-8.2.1).

1. 3
2. 20
3. 14
4. 1

D. Copy and answer as indicated (use Table 50-8.2.1).

1. Find the square root of 196.
2. Find the square root of 12 to the nearest tenth.
3. Find $\sqrt{18}$ to the nearest hundredth.
4. Find $(2.828)^2$ to the nearest whole number.

TOPIC 50-8.3

SQUARE ROOT ALGORITHM (OPTIONAL)

OBJECTIVE:

- To compute square roots using the square root algorithm.

A. Copy and compute.

1. Find $\sqrt{85}$ to the nearest tenth.
2. Find $\sqrt{11}$ to the nearest hundredth.
3. Find $\sqrt{11025}$.
4. Find $\sqrt{145.92}$ to the nearest tenth.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-8.3

B. Copy and compute the following.

1. $\sqrt{6.25}$
2. $\sqrt{.0625}$
3. $\sqrt{5184}$
4. $\sqrt{9.4249}$

C. Copy and compute each of the following, to the nearest tenth.

1. $\sqrt{.2916}$
2. $\sqrt{1672.81}$
3. $\sqrt{.09}$
4. $\sqrt{42}$

TOPIC 50-9

PYTHAGOREAN THEOREM

OBJECTIVE:

- To apply the Pythagorean Theorem.

A. In each of the following a and b represent sides of a right triangle and c its hypotenuse. Using the Pythagorean Theorem, $a^2 + b^2 = c^2$, find the missing part.

1.	$a = 5$	$b = 12$	$c =$?
2.	$a = 12$	$b = 12$	$c =$?
3.	$a = 2\frac{1}{2}$	$b =$?	$c = 6$
4.	$a =$?	$b = 12$	$c = 18$

5. A rectanglar shaped corner let has a diagonal length of 210 feet. The length of the side on the front street is 65 feet. If the corner angle is 90^0, what is the length of the side on the side street?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-10.1

MEASUREMENT OF LENGTH IN ENGLISH UNITS

OBJECTIVE:

● To solve problems involving perimeter and circumference in English units.

A. Find the answer.

1. Find the perimeter of a rectangle whose lenght is 16 ½ ft. and whose width is $\frac{2}{3}$ ft.
2. Find the side of a square whose perimeter is 5 yd. 4 in.
3. Find the perimeter of a triangle (in yd. ft. in.) whose first side measures 1 yd., second side measures 4 ft., and third side measures 25 in.
4. Find the radius of a circle when the circumference is 44 ft. Use $\frac{22}{7}$ for π.
5. Which lot will take more fencing to enclose it?
   Lot A: a rectangle 135 feet long by 90 feet wide.
   Lot B: a square with sides whose length are 100 feet.
6. What should the diameter of a circular track be if the mile is to be run in 20 laps around the track? Use $\frac{22}{7}$ for π.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-10.1

B. On another sheet of paper, write the letter of the geometric figure that best illustrates the term in the left-hand column.

___?___ 1. triangle

___?___ 2. diameter

___?___ 3. rectangle

___?___ 4. circle

___?___ 5. square

___?___ 6. radius

(a)

(b)

(c)

(d)

(e)

(f)

C. On another sheet of paper, write the corresponding letter of the item on the right that best matches the phrases in the column on the left.

___?___	1. circimference of a circle	(a)	$P = 2\ell + 2w$
___?___	2. perimeter of a square	(b)	$\frac{22}{7}$ or 3.14
___?___	3. relationship of radius and diameter of a circle	(c)	$c = \pi d$
___?___	4. approximation used for π	(d)	$P = a + b + c$
___?___	5. perimeter of a rectangle	(e)	1 mile
___?___	6. perimeter of a triangle	(f)	$d = 2r$
___?___	7. 5,280 ft.	(g)	$P = 4s$

TOPIC 50-10.2

MEASUREMENT OF WEIGHT (MASS) IN ENGLISH UNITS

OBJECTIVE:

- To solve problems involving weight in English units.

A. Work the following.

1. What part of a pound is 8 oz.?
2. How many ounces in one ton?
3. Find the cost of a 5 pound 8 ounce chichen at $.62 a pound.
4. At $1.12 per pound, how many ounces of candy should you get for $.35?
5. Find the difference in price per ounce of tea if brand A costs $.48 for 4 oz. and brand B costs $1.60 for 1 lb.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-10.2

B. Copy and fill in correct value.

1. 1 lb. = ___?___ oz.

2. 1 ton = ___?___ lb.

3. 56 oz. = ___?___ lb.

TOPIC 50-10.3

MEASUREMENTS OF AREA IN ENGLISH UNITS

OBJECTIVE:

- To solve problems involving area in English units.

A. Work the following.

1. Find the area of a triangle whose base is 7 feet and whose altitude is 6 inches.
2. Find the area of a circle having a radius of 4 yards. (For π use 3.14.)
3. If the area of a square is 121 square feet, what is the length of one side?
4. Find the total surface area of a rectangular solid 9 feet by 6 feet 3 inches by 5 feet 4 inches.
5. How many 9 inch by 9 inch tiles are needed to cover a floor 12 feet by 10 feet?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-10.3

B. Copy and find the products.

1. 8 feet × 3 feet
2. 9 feet × 4 inches
3. 8 feet 6 inches × 10 feet 2 inches
4. $3.14 \times (11 \text{ ft.})^2$

TOPIC 50-10.4

MEASUREMENT OF VOLUME IN ENGLISH UNITS

OBJECTIVE:

- To solve problems involving volume in English units.

A. Work the following.

1. Find the volume of a rectangular solid 6 feet long, 8 feet wide, and 5 feet high.
2. If the volume of a cube is 512 cubic inches, how long is one edge?
3. Find the volume of a cylinder 10 feet high if the diameter of the base is one foot. (For π use 3.14.)
4. How many cubic yards of sand will be needed to cover an area 12 feet by 18 feet so that it will be 2 inches deep in sand?

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-10.4

B. Copy and work the following.

1. 8 ft. × 3 ft. × 6 ft. 4 in.
2. 100 in. × 3.14 × $(28 \text{ in.})^2$
3. $\frac{4}{3} \times 3.14 \times (30 \text{ yd.})^3$
4. 200 square miles × 3.7 miles

C. Copy and solve for the letter indicated.

1. 64 cu. ft. = s^3 (Solve for s.)
2. 400 cubic inches = 10 inches × 8 inches × h (Solve for h.)
3. 28 cubic yard = $\frac{1}{3}$ × B × 7 yard (Solve for B.)

TOPIC 50-11.2

MEASUREMENT OF LENGTH IN METRIC AND ENGLISH UNITS

OBJECTIVES:

- To measure length in metric units.
- To convert English to metric units or metric units to English units.

A. Copy and answer as indicated.

1. Measure this line segment and give its length in centimeters (cm.).

2. Measure this line segment and give its length in decimeters (dm.).

3. 1 yard = ___?___ centimeters (cm.).
4. 1 kilometer (km.) = ___?___ miles.
5. 1 mile = ___?___ kilometers (km.).

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-11.2

B. Copy and determine.

1. 2.5 decimeter (dm.) = __?__ meters.
2. 2.5 meters = __?__ mm.
3. 2.5 hectometers (hm.) = __?__ meters.
4. 2.5 dekameter (dkm. or dam.) = __?__ km.
5. 2.5 meters = __?__ cm.

C. Copy and determine.

1. 60 miles per hour = __?__ km. per hour
2. 1 foot = __?__ cm.
3. 1 yard = __?__ meter
4. 1 kilometer = __?__ mile
5. A man is 6'2" tall. What would his height be in meters?

TOPIC 50-11.3

MEASUREMENT OF AREA IN METRIC AND ENGLISH UNITS

OBJECTIVE:

- To use and convert English and metric units of area.

A. Determine answer.

1. Change one square foot to square centimeters.
2. Change one square yard to square meters.
3. A picture measures 6 cm. by 9 cm., express the area in square inches.
4. One square meter contains how many square feet?

HAVE YOUR WROK CHECKED BEFORE PROCEEDING!

TOPIC 50-11.3

B. Copy and determine as requested.

1. 1 inch = ___?___ cm.
2. 1 square inch = ___?___ square cm.
3. 1 yard = ___?___ meters
4. 1 meter = ___?___ inches
5. 1 square yard = ___?___ square meters
6. A rectangle measures 105 cm. × 350 cm. = ___?___ sq. meters

C. 1. The base of a circular tank has a diameter of 3.85 meters. Find the area of the base in square meters.

2. The area of a square is 6.25 square meters, find the length of the side in feet and inches.
3. A circular peate has an area of 20.378 square centimeters. Find its diameter to the nearest inch. (Use 3.14 for π.)

TOPIC 50-11.4

MEASUREMENT OF CAPACITY IN METRIC AND ENGLISH UNITS

OBJECTIVE:

- To convert units of capacity and metric units.

A. Copy and determine answers.

1. 5 quarts = __?__ liters.
2. 5 liters = __?__ gallons.
3. 1 pint = __?__ dekaliters
4. $\frac{1}{2}$ pint = __?__ centiliters
5. 1 liter = __?__ kiloliter

➧ HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-11.4

B. Copy and determine the answer.

1. 250 milliters = __?__ deciliters
2. 5 dekaliters = __?__ milliters
3. 1.2 kiloliters = __?__ liters
4. 312 deciliters = __?__ kiloliters
5. 585 centiliters = __?__ dekaliters

C. 1. 1 cup = __?__ milliliter
2. A container measures 10.5 cm. by 2 dc. × .5 dc. long will hold how many liters?
3. A coffee urn contains 24 cups will have how many deciliters?
4. A glass contains 150 centiliters of water, how many pints will this be?
5. 20 gallons of gas equals how many liters?

TOPIC 50-11.5

MEASUREMENT OF MASS IN METRIC AND ENGLISH UNITS

OBJECTIVE:

- To use English and metric units of mass.

A. Copy and determine answers.

1. 1 kilogram (kg.) = __?__ pounds.
2. 1.5 centigrams = __?__ grams.
3. 220 kilograms = __?__ pounds.
4. 34 dekagrams = __?__ hectograms.
5. A man weighs 210 pounds = __?__ kg.

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-11.5

B. 1. 1 milligram = ___?___ gram.

2. 1 centigram = ___?___ grams.

3. 1 decigram = ___?___ grams.

4. 1 gram = ___?___ kg.

5. 1 dekagram = ___?___ kg.

6. 1 hectogram = ___?___ kg.

C. 1. 5 pounds = ___?___ kg.

2. 25 kg. = ___?___ pounds

3. 1 ounce = ___?___ grams

4. A woman 1.6 meters tall weighs 95 kg. Should she eat more or go on a diet?

TOPIC 50-11.6

MEASUREMENT OF TEMPERATURE IN ENGLISH AND METRIC UNITS

OBJECTIVE:

- To use and convert English and metric temperature readings.

A. Work the following.

1. If the temperature of a sick child is 102.4^0 F., how far above normal (98.6^0) is his temperature?
2. What Fahrenheit temperature is equivalent to 120^0 C. if to change Centigrade to Fahrenheit you multiply the Centigrade temperature by $\frac{9}{5}$ and add 32^0?
3. To change Fahrenheit temperature readings to Centigrade you subtract 32^0 from the Fahrenheit readings, then take $\frac{5}{9}$ of the result. Change 50^0 F. to Centigrade.
4. Find the average temperature for a week whose seven daily average readings were 78.3^0 F., 76^0 F., 79.2^0 F., 78.5^0 F., 77.9^0 F., 78^0 F., and 77.5^0 F.
5. The normal reduction in the temperature of a parcel of air is 3.6^0 Fahrenheit per 1,000 ft. Find the altitude when the temperature is 63^0 F. when the surface temperature is 81^0 F.

HAVE YOUR WORK CHEKCED BEFORE PROCEEDING!

TOPIC 50-12

SOLUTION OF LINEAR EQUATIONS

OBJECTIVE:

- To solve linear equations.

A. Copy and solve for the unknown. Check the answers by substitution and show your work.

1. $x + 4 = 10$
2. $\frac{x}{2} = 36$
3. $7 = 3n - 5$
4. $y + 7 = y - 9$

HAVE YOUR WORK CHECKED BEFORE PROCEEDING!

TOPIC 50-12

B. Copy and solve for the unknown.

1. $7x - 8 = 5x + 6$
2. $3 - 8y = 2y + 8$
3. $18 = 4n - 6$

C. Copy and solve for the unknown.

1. $4x = -12$
2. $-5n = 7$
3. $\frac{3}{4} n = 24$

D. Copy and solve for the unknown.

1. $x + 8 = 7$
2. $x - 11 = -4$
3. $-2 = n + 8$

E. An equation may be transformed to a simpler equivalent equation by use of the additive and multiplicative inverses. Copy and fill in the blanks.

$$5n + 2 = 3n - 8$$

$$5n + (-3n) + 2 = 3n + (\underline{\ ?\ }) - 8$$

$$2n + 2 = \underline{\ ?\ }$$

$$2n + 2 + (-2) = -8 + (-2)$$

$$2n = \underline{\ ?\ }$$

$$\frac{1}{2} \cdot 2n = \frac{1}{2} \cdot \underline{\ ?\ }$$

$$n = \underline{\ ?\ }$$